



Drive Cost Savings through Insulation and Enhanced Maintenance Practices to Energy Efficiency



# How many people would invest \$200,000?

- 20 month payback
- Internal Rate Return (IRR) 63%
- Annual Energy Savings \$175,000 for 15 years

Plant Conditions

Best Practice

ROI

Methodology

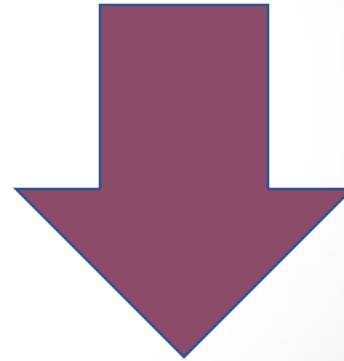
Applications

Pipes are Insulated

Flanged Fittings, Complex Surfaces remain Uninsulated

Insulation is Removed for Inspection, Service, Repair

Insulation is Not Reinstalled



Results In

Large Radiant Heat Loss

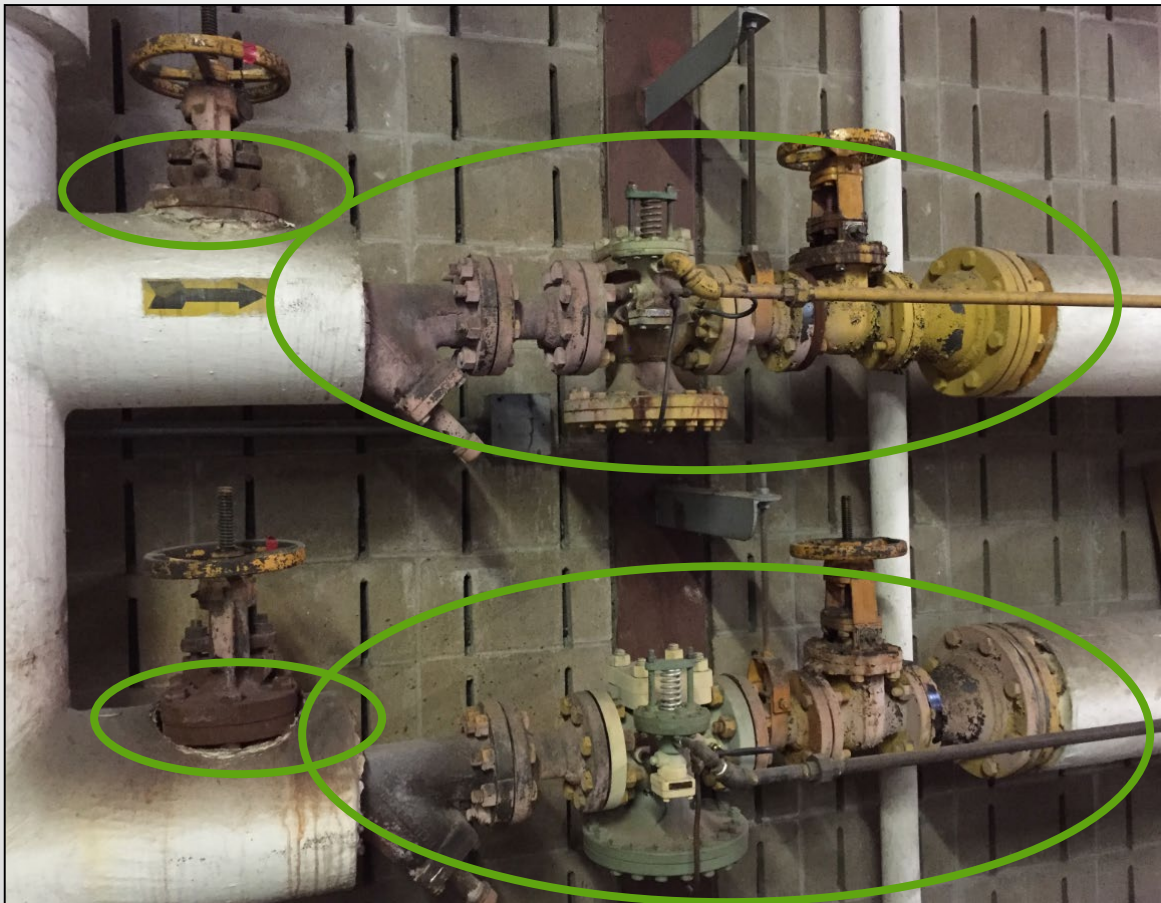
Most Wasted Energy is in Fittings, NOT pipe

Gate Valves, Control Valves, Strainers, Flanges

# Plant Conditions

## Pressure Reducing Station (4" @ 150 psi)

16 flanged fittings = 41.8 Linear Feet of Pipe



### Upper Run

Gate Valve Stem

Strainer

Flanged Spool

Pressure Reducer Valve

Flanged Spool

Gate Valve

Reducer

Flange

### Lower Run

Gate Valve Stem

Strainer

Flanged Spool

Pressure Reducer Valve

Flanged Spool

Gate Valve

Reducer

Flange

# Plant Conditions

## Surface Area Drives Energy Savings

### Upper Run

Gate Valve Stem  
Strainer  
Flanged Spool  
Pressure Reducer Valve  
Flanged Spool  
Gate Valve  
Reducer  
Flange

Installed Cost: \$2,636

Energy Savings: \$2,149

### Lower Run

Gate Valve Stem  
Strainer  
Flanged Spool  
Pressure Reducer Valve  
Flanged Spool  
Gate Valve  
Reducer  
Flange

Installed Cost: \$2,636

Energy Savings: \$2,149

Installed Cost:  
\$5,272

Energy Savings:  
\$4,298 per Year

Payback: 14.7 Mo.  
IRR: 59%

# Cost Analysis

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## Sample Savings – Bare Valves

(Fuel Cost \$17.63/ 1000 lbs Steam @ 350F)

Gate Valve Size	Operating Cost Bare	Oper. Cost Insulated	Energy Savings/Yr
10" 150#	\$ 2,121	\$ 148	\$ 1,973
8" 150#	\$ 1,574	\$ 109	\$ 1,465
6" 150#	\$ 1,174	\$ 82	\$ 1,092
4" 150#	\$ 813	\$ 57	\$ 756
2 ½" 150#	\$ 547	\$ 39	\$ 508

Numbers are annualized

# Cost Analysis

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Compare Valves SF to Pipe SF

Gate Valve Size	Gate Valve SF	Pipe Size (IPS)	Equal LF of Pipe
10" 150#	15.9 SF	10"	5.9
6" 150#	8.8 SF	6"	5.2
2 ½" 150#	4.1 SF	2 ½"	5.7

SF – Surface Area



# Cost Analysis

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## Surface Area is Compelling

Bare Fittings	LF Bare Pipe	Facility Size	Investment	Annual Savings
60	334	Mechanical Rm	\$18,000	\$12,000
600	3,340	Hospital	\$180,000	\$120,000
1600	8,896	Small College	\$480,000	\$320,000
3200	17,792	University	\$960,000	\$640,000
6400	35,584	Large Campus	\$1,920,000	\$1,280,000



Plant Conditions

Best Practice

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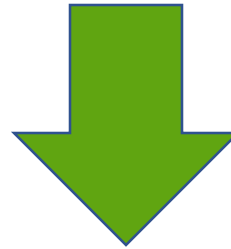
Applications

Pay Attention to the “Un-Insulated” surfaces

Treat All Surfaces

Manage the System

Regardless of what materials are applied



Treat Insulation as a Managed Asset

Energy Savings drops to the bottom line as profit

Proper insulation can add to your competitive edge

# Best Practice

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Define Potential Opportunities

Energy Survey Development

Quality Control

Apply “Proven” Design Specification Standards

Quality Product via CAD and CNC Driven Manufacturing

Manage Assets

Incorporate into SOP/CMMS Systems

Blanket Maintenance Program

Check Every 2 Years After Initial Installation .... Manage the Investment

# Best Practices

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Be careful What You Ask For .....

Application Drives the Specification Standard



Food Processing

Wash down condition

Blanket is not suitable  
for this application

Order the blanket to  
standard & specify the  
operating conditions  
(Application)

# Best Practices

## Apply a Proven Design Standard

### Shannon Design Specification - Reference

#### THERMAL BLANKET HEAT SHIELD

Specification	Product	Test Standard	Applications	Service	Attribute	Temperature
LT200VLP	Thermal Blanket	ASTM-C335	Valves, Fittings, Pumps	Chilled Water/Hot Water	Non-Porous	250
LT250VP	Thermal Blanket	ASTM-C335	Valves, Pumps, Chiller Heads	Chilled Water/Hot Water	Non-Porous	250
LT450SS	Thermal Blanket	ASTM-C335 / E-84	Valves, Fittings, Pumps	Steam/Hot Water	Non-Porous	450
LT550SSM	Thermal Blanket	ASTM-C335		Steam	Non-Porous	550
MT800SGM	Thermal Blanket	ASTM-C335	Valves, Fittings, Steam Turbines	Steam	Porous	800
HT1100MSGM	Thermal Blanket	ASTM-C335	Steam Turbines, T&T Valves	Steam	Porous	1100
LT500HS-AG	Heat Shield	ASTM-C335	Steam Traps, Boiler Doors	Steam	Porous	500
LT500HS-TC	Heat Shield	ASTM-C335	Steam Traps, Boiler Doors	Steam	Porous	500
LT550LFP-M	Thermal Blanket	ASTM-C335	Expansion Joints, Pipe, Valves, Drip Legs		Chemical Resistant	550
LT450TT	Thermal Blanket	ASTM-C335 / E-84	Valves, Pumps, Equipment	Steam/Chemical Process	Non-Wicking	450
LT550TTM	Thermal Blanket	ASTM-C335	Valves, Pumps, Equipment	Steam/Chemical Process	Non-Wicking	550
MT800TGM	Thermal Blanket	ASTM-C335	Valves, Fittings, Steam Turbines	Chemical Process	Wicking	800
HT1100MTFM	Thermal Blanket	ASTM-C335	Valves, Pumps, Equipment	Chemical Process	Non-Wicking	1100
LT300LFP-EF	Thermal Blanket	FDA-21 CFR 177.1550	Valves, Pumps, Kettles, Pasturizers	Food Processing / Sanitary	Non-Porous/No-Fiber	300
LT550LFP-FG	Thermal Blanket	FDA-21 CFR 177.1550/ASTM E-336	Valves, Pumps, Kettles, Pasturizers	Food Processing / Sanitary	Non-Porous	550
HS1200FF-W	Heat Shield	ASTM-C335	Kettles, Friers, Piping, Pasturizers	Food Processing / Sanitary	Non-Porous	1200
MT850AGM	Thermal Blanket	ASTM-C335	Small Engine Exhaust, Mufflers, Turbo's	Power Generation/OEM	Porous	850
MT850AGGM	Thermal Blanket	ASTM-C335	Small Engine Exhaust, Mufflers, Turbo's	Power Generation/OEM	Porous	850
HT1100MSGM	Thermal Blanket	ASTM-C335	Mufflers, Turbo's, Exp Joints, Piping	Power Generation/OEM	Porous	1100
HS1200FF-S	Heat Shield	ASTM-C335	Gas Turbine Housings, Exhaust Ducting	Power Generation/OEM	Non-Porous	1200
HT1300MAGM	Thermal Blanket	ASTM-C335	Silencers, Turbo's, Ducting, Manifolds	Power Generation/OEM	Porous	1300
HT1500MSSiM	Thermal Blanket	ASTM-C335	Silencers, Turbo's, Ducting, Plenums, Converters	Power Generation/OEM	Porous	1500
HT1500MFFM	Thermal Blanket	ASTM-C335	Silencers, Turbo's, Ducting, Plenums, Converters	Power Generation/OEM	Non-Porous	1500
LT550SG	Thermal Blanket	ASTM-C335	Extruder Barrels, Blow Molding	Plastics Extrusion	Porous	550
MT850SSi	Thermal Blanket	ASTM-C335	Extruder Barrels, Blow Molding	Plastics Extrusion	Porous	850

#### ACOUSTIC BLANKET ACOUSTIC SHIELD

Specification	Product	Test Standard	Applications	Service	Attribute	Temperature
LT250A-VP	Acoustic Blanket	ASTM-E1222/ISO-15665	Liquid Chillers, Compressors, Pumps, Fans	HVAC/Commercial/OEM	Non-Porous	250

Plant Conditions

Best Practice

ROI

Methodology

Applications

# Pulp & Paper – Tissue Company

## Savings Over Multiple Locations

### (General Numbers for Illustration Purposes)

# Return on Investment

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Cash Flow Calculations	Year 1	Year 2
Investment	\$ (2,718,583)	\$ -
Annual Labor Costs	\$ (52,619)	\$ (52,619)
Annual Energy Savings	\$ 1,468,035	\$ 1,468,034
Depreciation (Straight Line)	\$ (271,858)	\$ (271,858)
EBITDA	\$ 1,143,557	\$ 1,143,557
Tax Provision	\$ (400,245)	\$ (400,245)
Net Income	\$ 743,312	\$ 743,312
Add Back Depreciation	\$ 271,858	\$ 271,858
Add Back Investment (1st Yr Only)	\$ (2,718,583)	n/a
Cash Flow	\$ (1,703,412)	\$ 1,015,171

Financial Calculations Based on Customer Cost of Capital (9%)

# Return on Investment

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Financial results	10 Years	15 Years
Payback Period	20.2 Months	20.2 Months
Net Present Value Project	\$ 4,811,605	\$ 6,192,185
Return On Investment (ROI) Including Operating Cost	53%	53.0%
Return on Investment (ROI) Simple – No Operating Costs	60%	60%
Cash Flow	\$ 7,433,123	\$ 12,033,223

Is this a compelling measure to  
warrant capital investment?



Plant Conditions

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Methodology

Applications

Perform Energy Survey

Calculate the ROI

Pay Attention to the “Un-Insulated” Surfaces

Treat All Surfaces

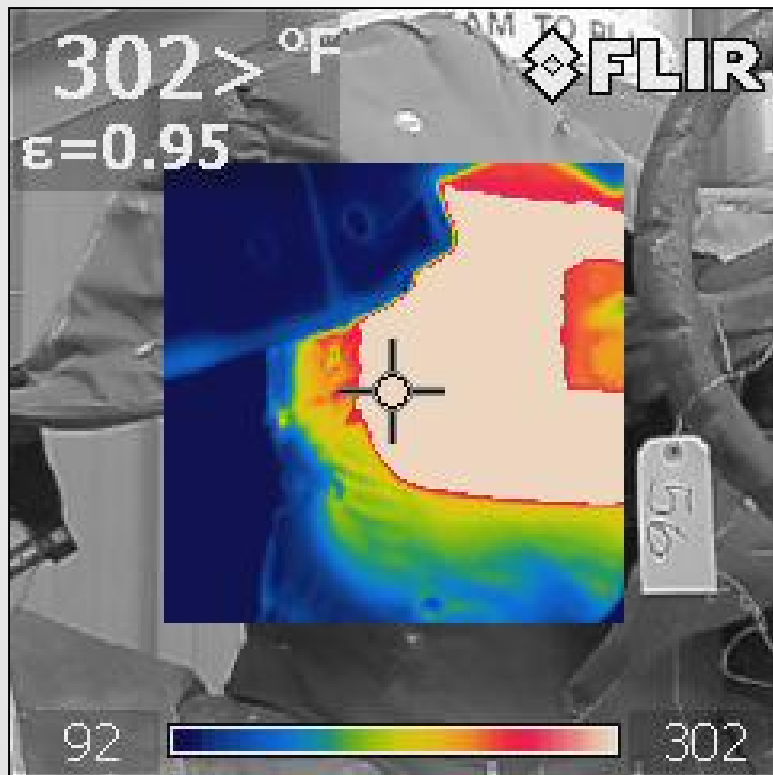
Apply a “Proven” Design Standard

Assure a Quality Installation

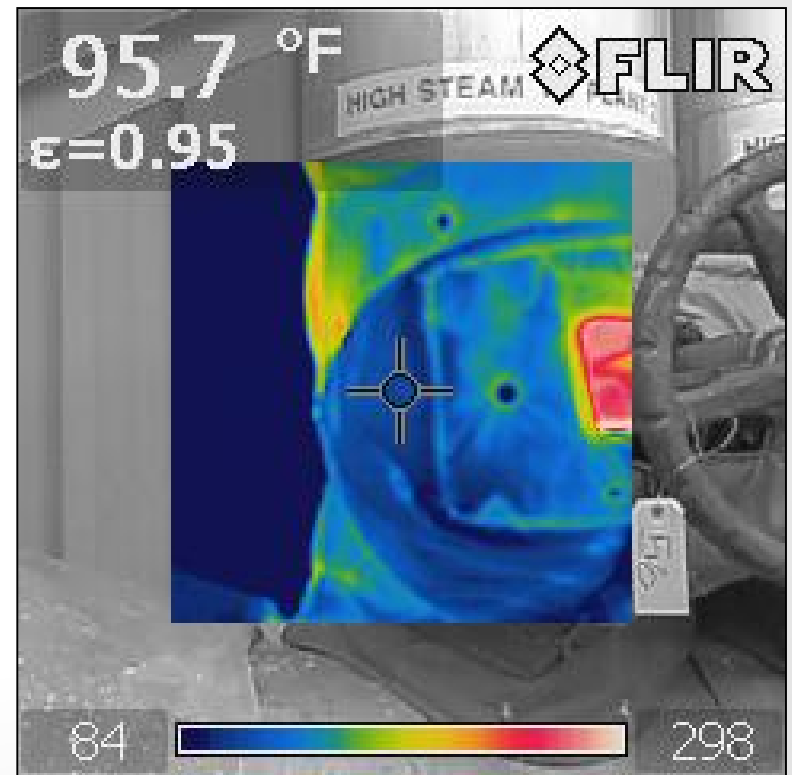
Manage the System (Check every 2-3 yrs)

# Methodology

## Perform an Energy Survey



Before



After

# Methodology

Track the Steam System From Boiler to Condenser

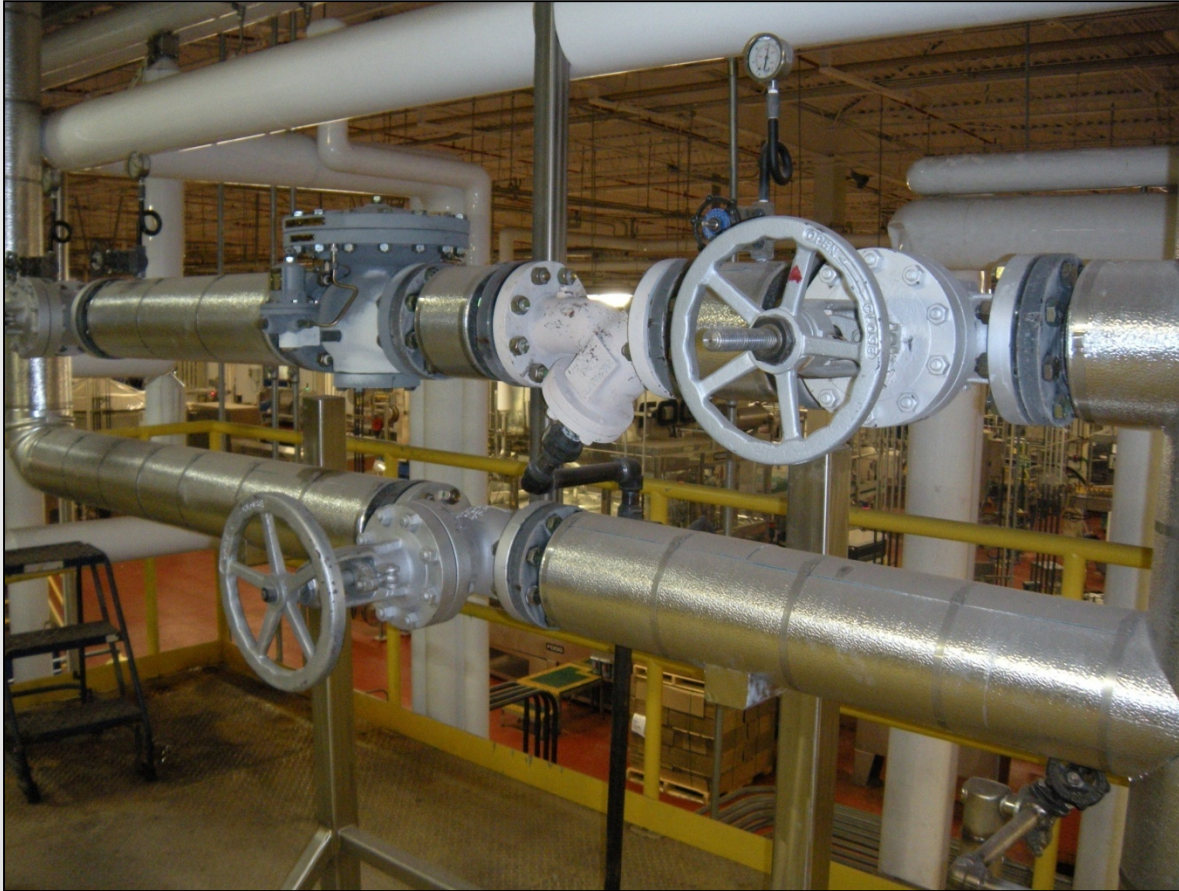




# Methodology

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## Find Untreated Fittings



4 Fittings 6"  
300 lbs

Installed Cost  
\$2,537

Energy Savings  
\$2,539

IRR 72%

Plant Conditions

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Applications

# Applications

## Pulp & Paper

## Mfg. Tissue

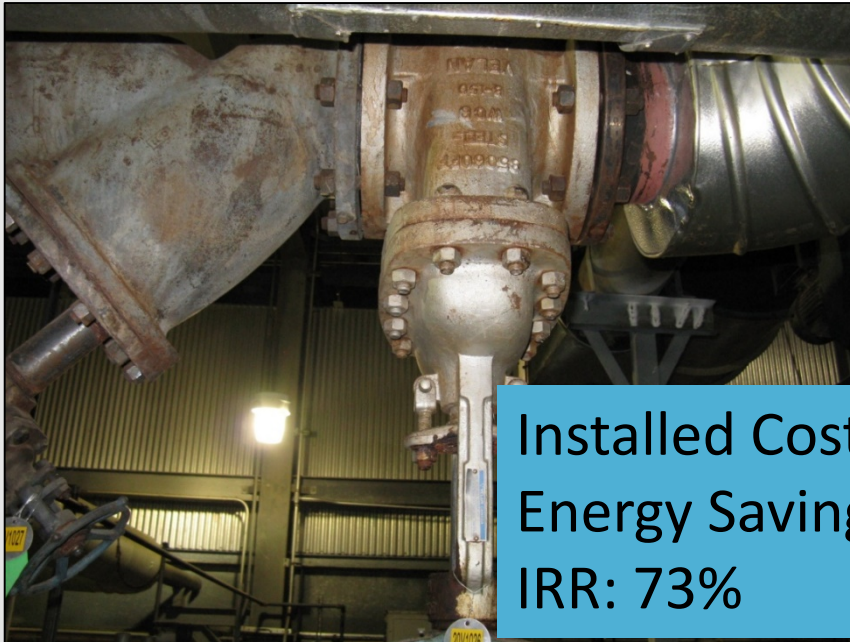
# Application

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**8" 150# Gate Valve**

**8" 150# Strainer**

**Before**



**After**





# Application

## 3" x 1-1/2" – 11 Gould Pump

Before



Installed Cost: \$728  
Energy Savings: \$439  
IRR: 43%

After

Thermal Blanket Insulation can be  
applied to "All Complex Surfaces"



# Application

## Multistage Feedwater Pump

Before



Installed Cost: \$2,389  
Energy Savings: \$1,692  
IRR: 51%

After

# Application

## After Condenser Ejector System



**Before**



**After**

Installed Cost: \$2,367  
Energy Savings: \$2,404  
IRR: 73%

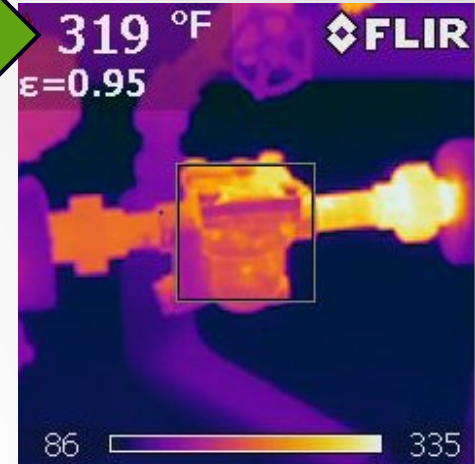


# Applications – Steam Traps

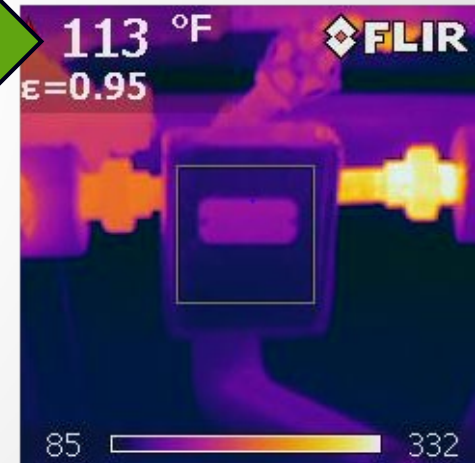


**Impact is Compelling !**  
(light weight / easy to install /  
remove and re-install)

Before



After



# Applications - Steam Traps

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## How Many Steam Traps in Your Inventory!

Ratio 1:1 to 1:3 Ratio  
Steam Traps to Uninsulated Steam Fittings

Sample Steam Trap Savings

Armstrong® Model ¾" 880 Steam Trap

Surface Temp: 274 F

Ambient Temp: 80 F

Heat Shield Cost: \$65.00

Energy Savings: \$49.55 per year

Payback Period: 17.2 months

IRR: 55%

# Acoustic Blankets

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Apply Acoustic Blanket as a direct (Wrap) to the radiant source.

Acoustic Blanket will “Attack the Noise” @ the source.

Low frequencies show slight increases due to increased radiant surface areas created by increased geometry. Impact is negligible.

Mid to high frequencies are greatly reduced.

Reduction targets range from 4 to 12 DBA.

Treat complex surface geometry (Compressors, Pumps, Motors).



## Water Cooled Screw Liquid Chiller



How many people would invest \$200,000?

- 20 month payback
- Internal Rate of Return (IRR) 63%
- Annual Energy Savings \$175,000 for 15 years

If the Answer is YES, we need to talk about your plant's untreated fittings!

What other projects deliver IRR 63%?



# Contact Information

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